

ABSTRACT

THESIS: Initial Performance Studies of the Forward GEM Tracker

STUDENT: Malorie R. Stowe

DEGREE: Master of Science

COLLEGE: Sciences and Humanities

DATE: December, 2012

PAGES: 70

The spin of the proton is thought to be produced by several constituents including quarks, antiquarks, and gluons. It has been the goal of the spin physics program at RHIC (Relativistic Heavy Ion Collider) to measure the contribution from gluons and various sea quarks to the proton spin. The Forward GEM Tracker (FGT) is a detector in STAR (Solenoidal Tracker at RHIC), which is one of two large experiments and is located at the RHIC collider at Brookhaven National Laboratory. The FGT serves to locate the position of forward-going charged particles, and it will be instrumental in observing the trajectories of decay leptons from W bosons, created by the interaction of the quark of one proton and the antiquark of another in a proton-proton collision. This position information will be helpful in determining the contribution of the quarks and antiquarks to the spin of the proton. This analysis investigates the initial performance of the FGT. Studies were conducted using cosmic-ray test data collected during the detector's construction and more recent data from polarized-proton collisions within STAR. The goals of these studies were: to see if the detector works, see how well it works, check for any odd behavior, and optimize the performance of the detector.